TYN40Y-800T

SCR

Rev.01 - 14 April 2022 Product data sheet

1. General description

Planar passivated Silicon Controlled Rectifier (SCR) in IITO220 internally insulated plastic package intended for use in applications requiring very high inrush current capability, high thermal cycling performance and high junction temperature capability ($T_{j(max)}$ = 150 °C).

2. Features and benefits

- High junction operating temperature capability ($T_{j(max)}$ = 150 °C)
- High bidirectional blocking voltage capability
- Very high current surge capability
- High thermal cycling performance
- Planar passivated for voltage ruggedness and reliability
- Internally insulated package
- Isolated mounting base with 2500 V (RMS) isolation

3. Applications

- High voltage capability
- Protection circuit in Power Supplies for Consumer / Industrial / Medical Equipment
- Capacitive Discharge Ignition (CDI)
- Crowbar protection
- Inrush protection
- Motor control
- Voltage regulation

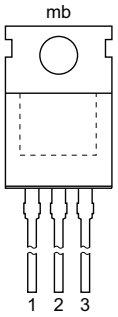
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
V_{DRM}	repetitive peak off-state voltage			800			V
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 97$ °C; Fig. 1; Fig. 2; Fig. 3		40			A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(init)}$ = 25 °C; t_p = 10 ms; Fig. 4; Fig. 5		450			A
		half sine wave; $T_{j(init)}$ = 25 °C; t_p = 8.3 ms		495			A
T_j	junction temperature			-40 to 150			°C
Symbol	**Parameter**	**Conditions**	**Notes**	**Min**	**Typ**	**Max**	**Unit**
Static characteristics							
I_{GT}	gate trigger current	V_D = 12 V; I_T = 0.1 A; T_j = 25 °C; Fig. 7		-	-	15	mA
I_H	holding current	V_D = 12 V; T_j = 25 °C; Fig. 9		-	-	60	mA
V_T	on-state voltage	I_T = 80 A; T_j = 25 °C; Fig. 10		-	-	1.60	V
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	V_{DM} = 536 V; T_j = 150 °C; (V_{DM} = 67% of V_{DRM}); exponential waveform; gate open circuit		500	-	-	V/µs

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		
2	A	anode		
3	G	gate		
mb	n.c.	mounting base; isolated		

6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
TYN40Y-800T	IITO220	TYN40Y-800TQ	Tube	50	SOT78D	07-July-2010

7. Marking

Table 4. Marking codes

Type number	Marking codes
TYN40Y-800T	TYN40Y 800T

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Notes	Values	Unit
V_{DRM}	repetitive peak off-state voltage			800	V
V_{RRM}	repetitive peak reverse voltage			800	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 97$ °C;		25	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 97$ °C; Fig. 1; Fig. 2; Fig. 3		40	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(init)} = 25$ °C; $t_p = 10$ ms; Fig. 4; Fig. 5		450	A
		half sine wave; $T_{j(init)} = 25$ °C; $t_p = 8.3$ ms		495	A
I^2t	I^2t for fusing	$t_p = 10$ ms; sine-wave pulse		1012.5	A^2s
dI_T/dt	rate of rise of on-state current	$I_G = 30$ mA		150	A/µs
I_{GM}	peak gate current			5	A
V_{GM}	peak gate voltage			5	V
P_{GM}	peak gate power			20	W
$P_{G(AV)}$	average gate power	over any 20 ms period		1	W
T_{stg}	storage temperature			-40 to 150	°C
T_j	junction temperature			-40 to 150	°C

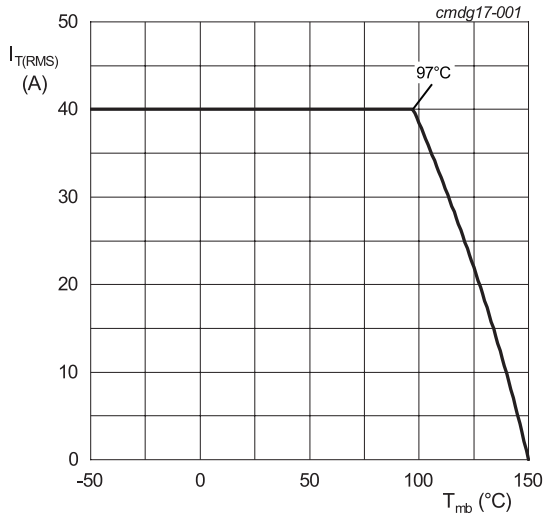
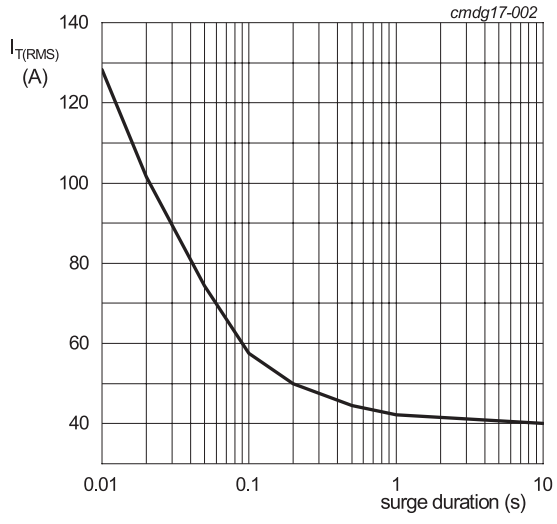
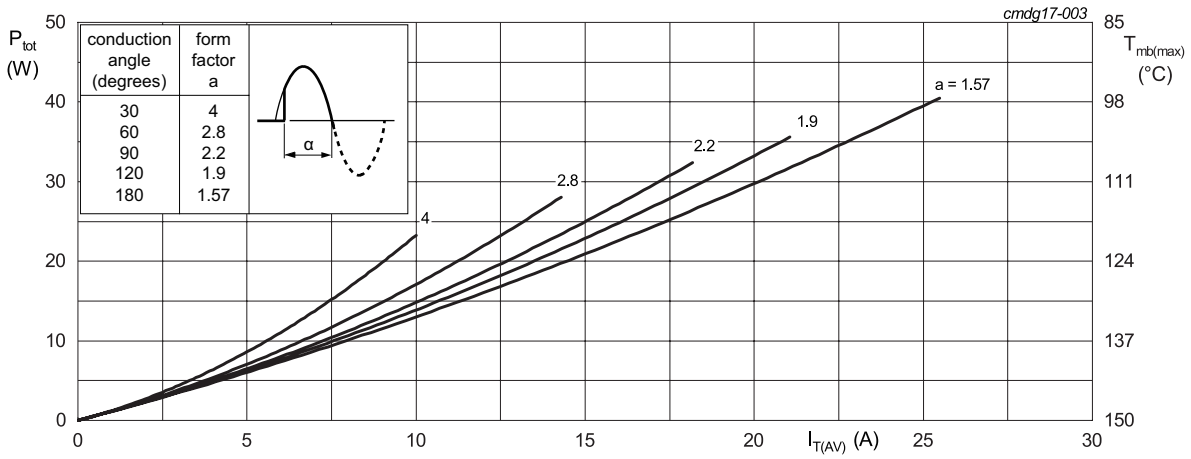


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values



f = 50 Hz; T_{mb} = 97 °C

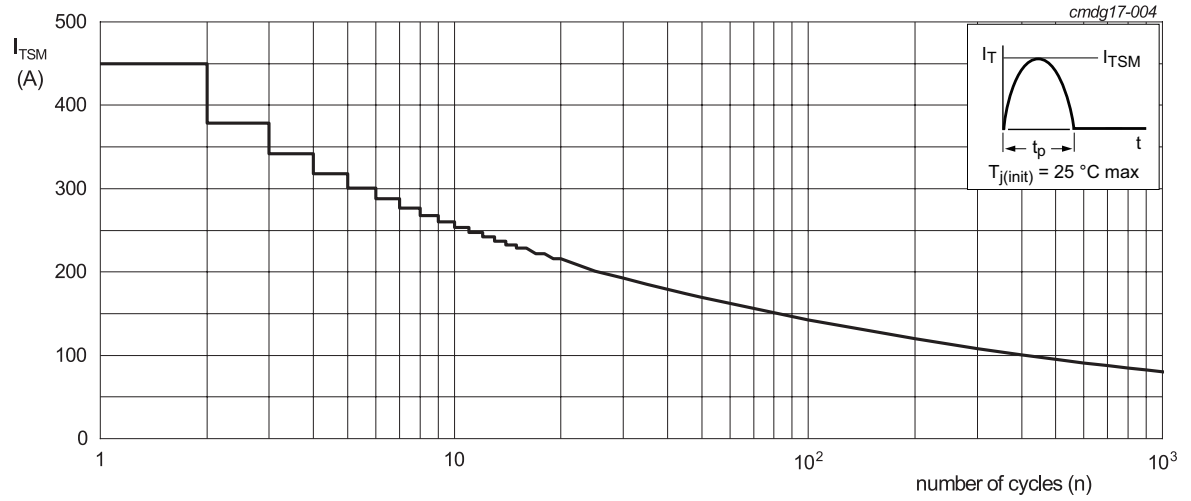
Fig. 2. RMS on-state current as a function of surge duration; maximum values



α = conduction angle

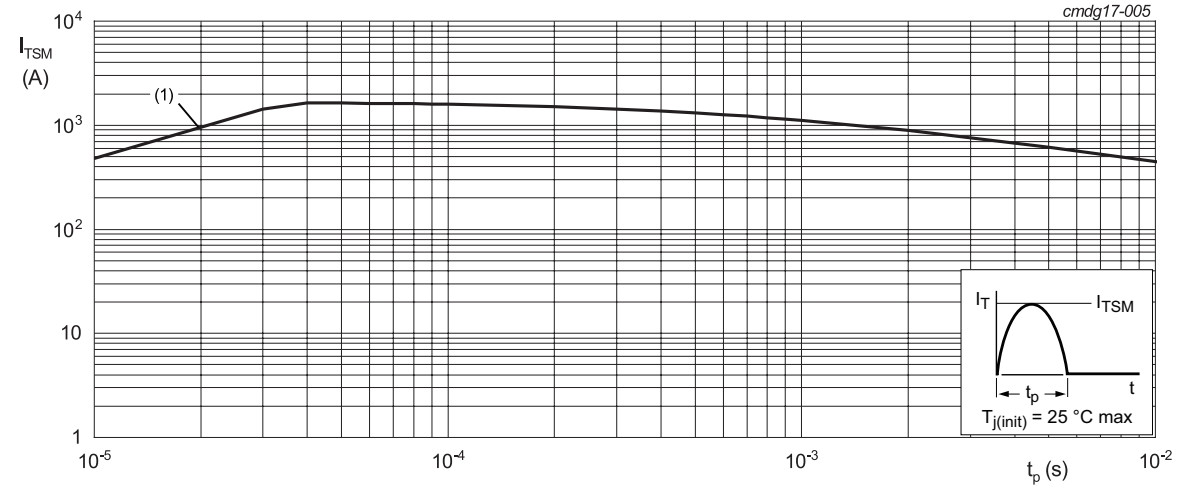
a = form factor = $I_{T(RMS)}$ / $I_{T(AV)}$

Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values



f = 50 Hz

Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



t_p ≤ 10 ms

(1) dI_T/dt limit

Fig. 5. Non-repetitive peak on-state current as a function of pulse duration; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	Fig 6		-	-	1.3	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air		-	60	-	K/W

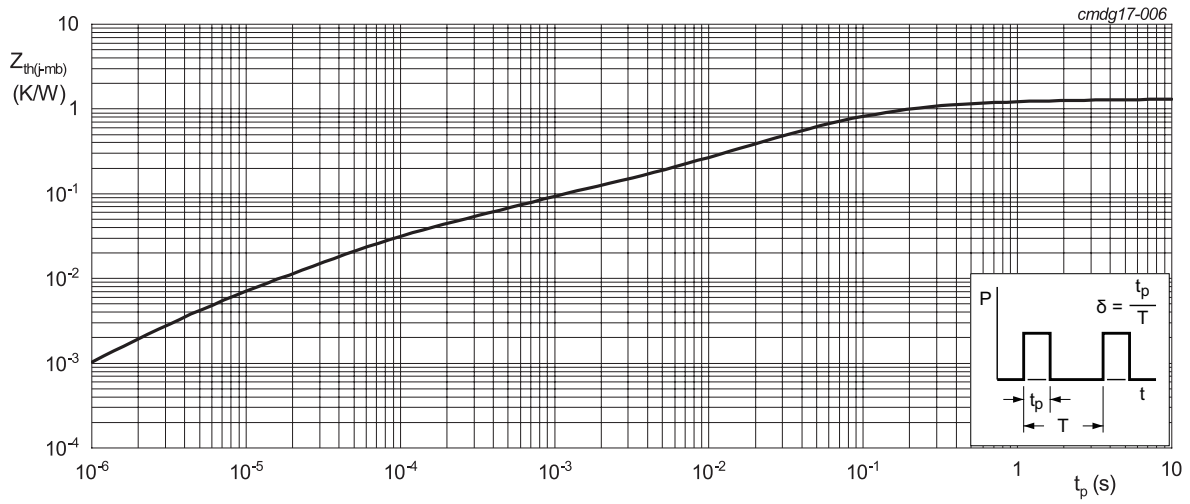


Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Isolation characteristics

Table 7. Isolation characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	50 Hz ≤ f ≤ 60 Hz; RH ≤ 65 %; from all pins to external heatsink; sinusoidal waveform; clean and dust free		-	-	2500	V
C_{isol}	isolation capacitance	from cathode to external heatsink		-	10	-	pF

11. Characteristics

Table 8. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	V_D = 12 V; I_T = 0.1 A; T_j = 25 °C; Fig. 7		-	-	15	mA
I_L	latching current	V_D = 12 V; I_G = 0.1 A; T_j = 25 °C; Fig. 8		-	-	80	mA
I_H	holding current	V_D = 12 V; T_j = 25 °C; Fig. 9		-	-	60	mA
V_T	on-state voltage	I_T = 80 A; T_j = 25 °C; Fig. 10		-	-	1.60	V
V_{GT}	gate trigger voltage	V_D = 12 V; I_T = 0.1 A; T_j = 25 °C; Fig. 11		-	0.7	1.2	V
		V_D = 800 V; I_T = 0.1 A; T_j = 150 °C		0.25	0.5	-	V
I_D	off-state current	V_D = 800 V; T_j = 25 °C		-	-	5	µA
		V_D = 800 V; T_j = 150 °C		-	-	2	mA
I_R	reverse current	V_D = 800 V; T_j = 25 °C		-	-	5	µA
		V_D = 800 V; T_j = 150 °C		-	-	2	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	V_{DM} = 536 V; T_j = 150 °C; (V_{DM} = 67% of V_{DRM}); exponential waveform; gate open circuit		500	-	-	V/µs
t_{gt}	gate-controlled turn-on time	I_{TM} = 40 A; V_D = 800 V; I_G = 30 mA; dI_G/dt = 5 A/µs; T_j = 25 °C		-	2	-	µs
t_q	commutated turn-off time	I_{TM} = 2 A; t_p = 50 µs; dV/dt = 5 V/µs; dI/dt = 30 A/µs; T_j = 25 °C		-	-	25	µs

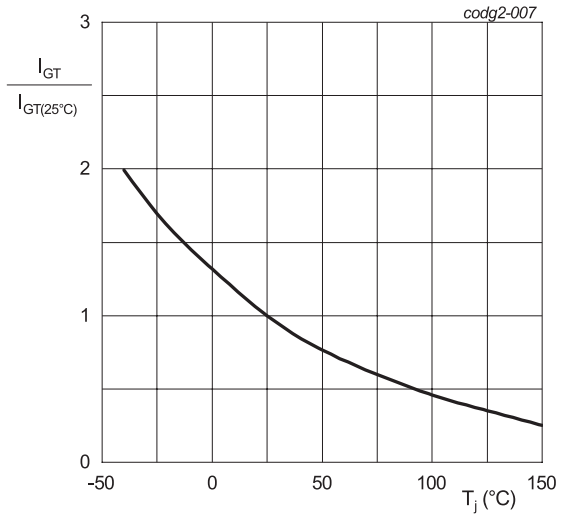


Fig. 7. Normalized gate trigger current as a function of junction temperature

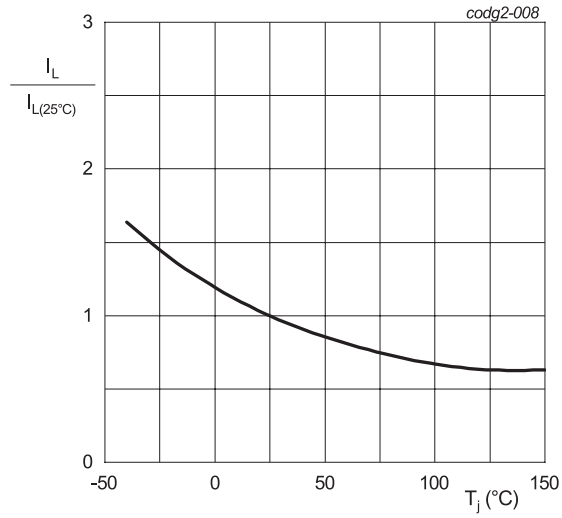


Fig. 8. Normalized latching current as a function of junction temperature

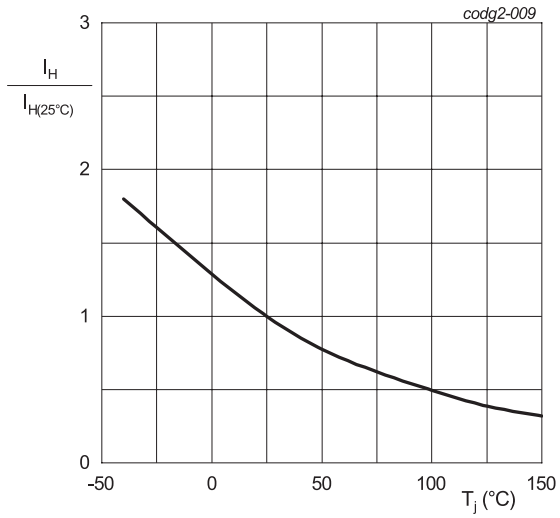
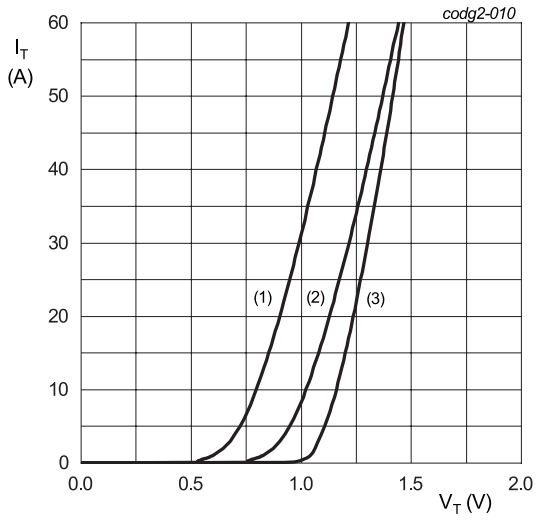


Fig. 9. Normalized holding current as a function of junction temperature



V_o = 1.114 V; R_s = 0.0076 Ω
(1) T_j = 150 °C; typical values
(2) T_j = 150 °C; maximum values
(3) T_j = 25 °C; maximum values

Fig. 10. On-state current as a function of on-state voltage

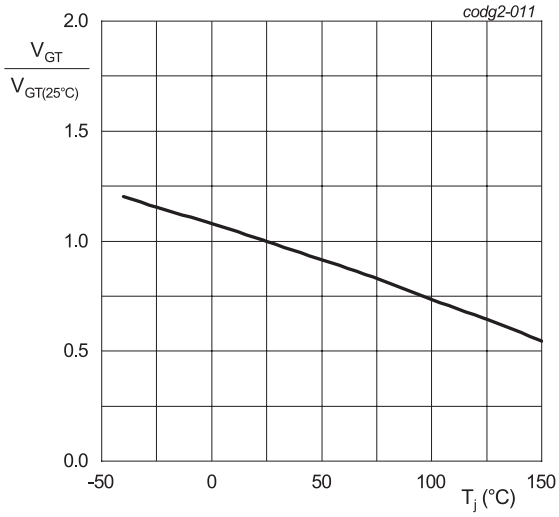
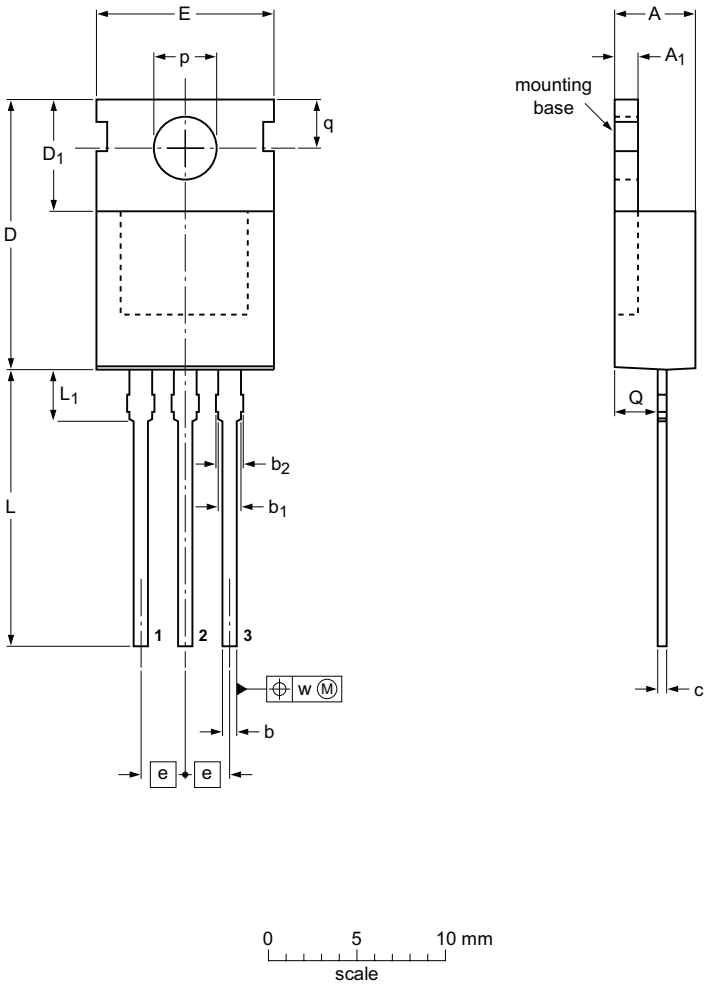


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

12. Package outline

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220 **SOT78D**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b	b_1	b_2	c	D	D_1 ref	E	e	L	L_1 ref	p	Q	q	w
mm	4.7 4.3	1.40 1.25	0.9 0.6	1.4 1.1	1.72 1.32	0.6 0.4	16.0 15.2	6.5	10.3 9.7	2.54	14.0 12.8	3.0	3.7 3.5	2.6 2.2	3.0 2.7	0.2

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT78D		TO-220				~~07-04-04~~ 07-07-10

13. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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